

तार : विश्वविद्यालय
Gram : UNIVERSITY



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बुन्देलखण्ड विश्वविद्यालय, झाँसी BUNDELKHAND UNIVERSITY, JHANSI


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संदर्भ.....

दिनांक..11/07/2022

The Minutes of Meeting of BOS

In reference to the BOS of department of Food Technology.....
....., Institute of Food Technology.....
..... held on 11/07/2022 regarding the
revision of syllabus in tune with CBCS/NEP-2020 and subsequent
approval from Academic Council. This is to certify that the syllabus is
100% revised.


HOD/Coordinator

Institute of Food Technology


A meeting of Board of Studies of Institute of Food Technology was convened on 11th July 2022 to decide the course structure and syllabus of Bsc honours in Food Science and Technology and Msc Food Science and Technology as per Choice Based Credit System and New Education Policy 2020 following members were present in the meeting.


1. Prof Shiv Kumar, Convener
2. Prof SS Shukla, JNKVV Jabalpur, Expert
3. Dr Nepal Singh DFM Foods, Expert
4. Dr. DK Bhatt, Member
5. Mr Manoj Kumar, Member

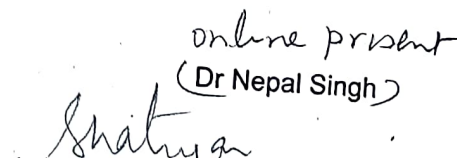
Minutes of the meeting

1. Panels of examiners of newly designed courses at UG and PG level as per guidelines of new education policy 2020 as well as old courses were approved.
2. Ordinances of B.Sc and M.Sc. courses along with the course structures were approved.
3. Two Value Added Courses viz (1) Jam and Jelly processing Technology (2) Milk Fermentation Technology, were also approved.
4. Syllabus of courses were discussed at length and experts suggested some major changes in the syllabus.
5. It was decided that the syllabus of courses should be changed as per suggestions by experts and after incorporation of changes in the syllabus should be sent on the mails of experts for confirmation within a week.
6. After final confirmation from the experts, the recommendations of the Board of Studies should be forwarded for the approval of the academic Council of the university.
7. Dr. Nepal Singh joined the meeting with following link
<https://meet.google.com/smj-bnuj-tiq>


(Mr Manoj Kumar)


(Dr. DK Bhatt)


(Prof SS Shukla) 11/7/2022

online present
(Dr Nepal Singh)

(Prof Shiv Kumar) 11/7/2022

B.Sc. (Food Technology)
SYLLBUS - 2015

FST 101/1041 GENERAL BIOLOGY

BOTANY:

UNIT-I

Angiosperms- Anatomy, various types of tissue, vascular bundles etc. Angiosperm Physiology- Mineral nutrition and ion transport, mineral deficiencies, vernalisation, senescence, Growth hormones, growth indices, growth movements. Fruit ripening- its molecular basis and manipulation.

UNIT II

Photosynthesis- Photochemical reactions, photorespiration, photophosphorylation, respiration (aerobic and anaerobic including fermentation- electron transport chain and oxidative phosphorylation, N₂ fixation and N metabolism, photoperiodism and flowering, Fruit and seed physiology. Dormancy, storage and germination of seeds.

ZOOLOGY:

UNIT III

General anatomy : Fishes, Birds and Mammals (Comparative) or just human being.

Physiology

UNIT IV

Circulatory System; Composition of Blood, Functions of Blood, Blood coagulation, Haemoglobin, blood group, Rh factor. **Muscular System;** Types of muscle, Mechanism of muscles contraction, **Urinary System ;** Nephron, Ornithine cycle, Urine formation.

UNIT V

Digestive system; Nutrition and its types, Digestion and its types, Human Digestive system and digestive glands, Digestion and Absorption of food(carbohydrate, protein and fats), Gastro-Intestinal hormones, Balanced diet. **Endocrine system;** Structure and secretion (hormones) of pituitary gland , thyroid gland, parathyroid gland, adrenal, pancreas gonads .

References:-

1. Text Book of Biology by P.S Dhami & G Chopra
2. Text Book of I.S.C Biology by Anita Prasad

FST 102/1042 GENERAL CHEMISTRY

UNIT -I

Chemical Bonds and Molecules :Characteristics of covalent bond, Ionic Bond, Co-ordinate Bond, Vanderwaal, Hydrogen-Bond, & Metallic Bond, Factors affecting the formation of Ionic/Covalent compounds, Born Haber Cycle, Fajan's Rule, Shapes of Molecules, Bond Length, Bond order, Bond Angle. Concept of Resonance, Valence Bond theory (Hybridisation). VSEPR concept, structure of water.

UNIT-II

Radioactivity: Natural & Artificial Radioactivity, Group Displacement Law, Rate of Disintegration & Half Life Period, Mass Defect and Binding Energy, Nuclear Fission & Fusion, Applications of Radioactivity, Nuclear Force & Nuclear Stability, Disintegration series.

UNIT- III

Periodic Table :Modern Periodic Table, Periodicity in properties of elements, atomic radii, ionic and covalent radii, ionization energy, Electronegativity, Electron-Affinity, Lanthanide contraction, Inert pair effect. Acid and Bases: Elementary idea of Bronsted-Lowry and Lewis concept of acids and basis (Proton-donor acceptor and electron-donor acceptor systems). Relative strengths of Lewis acids and bases and the effect of substituents and the solvent on them. Concept of leveling and differentiating solvents. Hard Soft Acid base (HSAB). General Properties of 3rd elements and co-ordination compounds. Position in Periodic Table. General properties of 3-A elements.

UNIT- IV

Molecular compounds, IUPAC Nomenclature, Werner's Co-ordination theory, EAN Rule, Isomerism in Co-ordination compounds, Discussion of VBT and CFT. Role of tracer elements (Na, K, Mg, Ca, Mo, Cr, Mo, Co). Wohler's synthesis of Urea, concept of functional group, nomenclature and Isomerism, Homolytic and Heterolytic Fission. Types of reaction (addition, elimination, substitution and rearrangement) resonance vs tautomerism, Aldol condensation, Hoffman-bromide reactions, Pinacol-Pinacolone rearrangement, Beckmann rearrangement, Cannizzaro reaction, Friedel-Craft reaction, orientation in Benzene (Disubstitution) Reactive Intermediates (Carbonium Ion, Carbanion, Free Radical Carbons). Stereochemistry : Structural Isomerism (Introduction_ Optical activity and optical isomerism, Asymmetric carbon atom, geometrical isomers, Chirality, Chiral Molecules, Relative and Absolute configuration (R/s designation, E/z nomenclature, as applied to simpler structures) Isomers of lactic acid, Tartaric Acid structure and configuration of Glucose, Cyclic Hemi-Acetal Form of Glucose (Fischer and Haworth Projection).

UNIT- V

Chemical-Kinetics : Velocity of a reaction, Law of Mass Action, determination of rate constants for first and second order reactions. Order and Molecularity, General methods to determine the order of reaction, effect of temp., pressure, catalyst, activated complex (Collision theory of Bimolecular reactions). Chemical Equilibrium: Reversible reactions, equilibrium law, equilibrium constant, ionic equilibrium factors influencing equilibrium states, Relation between K_p and K_c , Buffer solution, Hydrolysis of salt, pH, K_{sp} , Common Ion effect. Surface tension, viscosity, their experimental determination and applications principles of fractional and steam distillation and solvent extraction. Nernst Distribution law. Electrochemistry : Emf of a cell, Galvanic cells, standard electrodes potential, types of electrodes, pH and its measurement, Acid-Base Titration curves, electrochemical series.

FST 103/1043 INTRODUCTORY FOOD TECHNOLOGY

UNIT I

Scope of food technology in India.

Food production and consumption patterns in India. Food pyramid. Major food industries and their products in India.

Role of food processing in Indian economy.

UNIT II

Basic constituents of food

Protein – Requirement and sources of proteins, deficiency diseases, amino acids, essential amino acids. Protein denaturation.

Fats – Sources, saturated and unsaturated fats, good and bad fat, Omega fatty acids, simple, compound and derived lipids.

Carbohydrates – Sources, requirement, classification of carbohydrates, dietary fibers and their role in foods.

Vitamins – Role of vitamins in human health, Fat and water soluble vitamins, their sources and deficiency diseases.

UNIT III

Basic concepts of common unit operations in food industry – Material handling, cleaning, separating, pumping, mixing, heat exchanging, evaporation, drying, freezing, freeze drying, packaging, thermal processing, D, Z, F and F₀ value.

UNIT IV

Fruits and vegetables – Different fruits and vegetables and their composition. Use of fruits and vegetables in human food. Dehydration of fruits, Candied fruits.

Cereals, pulses and oil seeds – Composition of wheat, rice, oat, barley, corn, soy bean, coconut, mustard, sunflower, cotton seed and their use.

Animal foods – Meat and meat animals, classification of animals, Composition of meat and egg. Benefits of meat consumption.

Milk – Fluid milk, composition of milk, toned and double toned milk, paneer and cheese.

UNIT V

Quality control, HACCP- Seven principles of HACCP, Risk management and risk communication, Structure of risk analysis, critical control points.

ISO 9000 – Origin of ISO, history of ISO, Benefits of ISO to society, Use of ISO, Implementation of ISO.

REFERENCES

1. Principles of Food Science (Borgstorm)
2. Food Science (Potter NN)
3. Fish processing (Gopakumar)
4. An Introduction to Food Science Technology and Quality Management (D K Bhatt and Priyanka Tomar)

FST 104/1044 ENVIRONMENTAL STUDIES

Unit-I

The Multi disciplinary nature of Environment studies. Definition Scope and importance, Need for public awareness.

Unit-II

Natural Resources.

Renewable and non-renewable resources.

Natural resources and associated problems,

- a- Forest resources; use and over-exploitation. Deforestation. Case studies. Timber extraction. Mining. dams and their effects on forest and tribal people.
- b- Water resources; use and over-utilization of surface and ground water floods drought, conflicts over water, dams benefits and problems.
- c- Mineral resources; use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d- Food resources; world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticides problems, water logging, salinity, case studies.
- e- Energy resources' growing energy need. Renewable and non-renewable energy sources, use of alternate energy sources, case studies.
- f- Land resources; land as a resource, land degradation, man induced landslides. Soil erosion and desertification.
 - Role of an individual in conservation of natural resources.
 - Equitable use of resources for sustainable lifestyles.

Unit-III

Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem
- Producers. Consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains. Food webs and ecological pyramids.
- Introduction types characteristics feature, structure and function of following ecosystems:-
 - a. Forest ecosystems.
 - b. Grassland ecosystems.
 - c. Desert ecosystems.
 - d. Aquatic ecosystems(pond, streams, lakes, rivers, oceans, estuaries).

Unit-IV

Biodiversity and its Conservation

- Introduction- Definition; genetics, species and ecosystems diversity.
- Biogeographically classification of India.
- Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at Global level, National and local levels.
- India as a mega-diversity nation.

B.Sc. (H) Food Technology

- Hot-spot of Biodiversity.
- Threats to biodiversity; habitat loss, poaching of wildlife, man wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of Biodiversity; In situ and conservation of biodiversity.

Unit-V

Environmental Pollution

Definition; Causes, Effect and control measures of ;-

Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution.

Soil waste management: Causes effected and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides.

Unit-VI

Social Issue and the Environment

- From unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation. Rain water harvesting. Watershed management.
- Resettlement and rehabilitation of people; its problems and concern, Case studies.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies.
- Wasteland reclamation.
- Consumerism and waste product.
- Environment protection act.
- Air (Prevention and Control of pollution) Act.
- Water (Prevention and Control of Pollution) Act.
- Wildlife protection Act.
- Forest Conservation Act. Public Awareness.

Unit-VII

Human Population and the Environment

- Population growth, variation among nations.
- Population explosion- Family Welfare program.
- Environment and Human Health.
- Human Right. Value Education. HIV/AIDS. Women and Child Welfare.
- Role of information Technology in Environment and Human Health. Case studies.

Unit-VII

- Visit to a local area to document environmental assets - river/forest/grassland/hill/mountain.
- Visit to local pollute site-Urban/Rural/Industrial/Agriculture.
- Study of common plants. Insects. Birds.
- Study of simple ecosystems-pond, river. Hill slopes, etc.
- Assignment. Herbarium etc.

REFERENCES

1. Ecology and Environment –Benu Singh.
2. Environment Studies – Suresh Kumar Dhameja.
3. Text Book of Environment Science –Anil Kumar Dey.

FST 201/2041 GENERAL BIOCHEMISTRY

Unit-I

Properties of water, weak acids & weak bases, pH & buffers.

Carbohydrates:- Classification, Kiliani synthesis, mutarotation, structures and importance of Mono, Oligo and polysaccharides, Maltose, Lactose, Sucrose, Isomaltose, glycogen starch, Homo and Hetero, polysaccharides, Proteoglycan, Mucopolysaccharides.

Lipids. Simple and compound lipids, Phosphoglycerides sphingolipids, terpenes, sterols and Eicosanoids structure of Biological membrane.

Unit-II

Amino Acids;- Chemical structure general properties and titration curve.

Proteins:- Structure of peptides, peptide bond, protein structure primary, secondary, Tertiary and Quaternary structure of protein, Forces stabilize the protein structure, salting out, salting in, Denaturation and renaturation.

Unit-III

Enzymes Name culture, classification: Michaelis Menten equation, Lineweaver-Burk plot competition, non competition and un competition inhibition, enzyme catalysis, substrate enzyme reaction, pro-enzyme and enzyme activation- Allosteric enzyme co-operativity. Importance of enzyme. **Nucleic Acid:-** Structure of Nucleic acid (DNA & RNA) Nucleotides & nucleosides, different forms of DNA, Denaturation and renaturation.

Unit-IV

Carbohydrates Metabolism :- Glycolysis fermentation, gluconeogenesis Glycogenolysis, Pentose phosphate pathway: TCA cycle, Glyoxylate pathway Electron transport chain.

Lipid Metabolism:- Digestion and absorption, β & ω Oxidation of fatty acids, fatty acid Biosynthesis, Ketone body formation, cholesterol biosynthesis, Urea Cycle

Unit-V

Molecular Biology & Biotechnology Replication of DNA (E. coli), transcription & translation, Recombinant DNA technology, plasmid, cosmid, Phage vector, Genomic and cDNA Library, Southern Northern, and western blotting.

REFERENCES

1. Biology for Chemist by Agrawal & Agrawal.
2. Biochemistry by Albert L Lehninger.
3. Biochemistry by U Satyanarayana & U Chakrapani
4. Fundamentals of Biochemistry by J L Jain, Sunjay Jain & Nitin Jain.

FST 202/2042 GENERAL MICROBIOLOGY

UNIT I

History and Scope of Microbiology. The discovery of Microorganism. Spontaneous generation versus biogenesis, the germ theory of disease, pure culture concept, structural organization of prokaryotic cells and eukaryotic cells . Cultivation of Microorganism: Types of culture media, synthetic and complex media, sterilization, aseptic transfer, isolation and incubation, Microbial nutrition (Requirements for C, H, O, N, P and S), nutritional types of Micro-organism, Isolation of pure culture (spread, streak and pour plate method).

UNIT II

Survey of Micro-Organism : A brief account of the classification of microorganisms. A general account on Virus, Bacteria, Algae, Fungi and Protozoa.

UNIT III

Microbial Metabolism: Chemical principles of metabolism, autotrophic and heterotrophic metabolism. Transport mechanism, Nitrogen metabolism and fixation. Biogeochemical cycles – Carbon cycle, Hydrogen cycle, Nitrogen cycle, Oxygen & Sulphur cycle

UNIT IV

Microbial Growth : The growth curve, Continuous culture of Microorganism. Factors influencing Microbial growth (Oxygen, water, pH, temperature, pressure, salinity). Physical and chemical control of Microorganisms, Antibiotics as chemotherapeutic agents.

UNIT V

Microorganisms and Human Diseases: A general account of disease causing microorganisms in humans- Respiratory tract diseases, Genitourinary tract diseases, Sexually transmitted diseases. Normal micro flora of human body.

REFERENCES

- Microbiology – An Introduction by Tortora, Funke and Case.
- An Introduction to Microbiology by Palczar.

FST 203/2043 Dairy Technology

UNIT-I

Milk : Chemical composition & nutritive value. Physico-chemical properties of milk: color, taste, flavor, O/R-potential, surface tension, specific heat, viscosity, refractive index, boiling point, freezing point electrical conductivity, pH and buffering capacity. Chemistry of milk constituent viz. fat, proteins, lactose, enzymes and vitamins.

UNIT-II

Market milk industry in India .Quality of raw milk.
Equipment and practices followed at rural milk collection centers, chilling centers, organized forms, mode of transport.
Use of hydrogen peroxide as preservative.
LP-system for milk preservation.
Naturally occurring preservatives in milk.
Milk reception, grading of milk, separation, clarification chilling and storage.
Milk adulterations: adulterants; synthetic milk; harmful effects, detection techniques.

UNIT-III

Milk processing viz. filtration, clarification, cream separation, standardization homogenization pasteurization, and sterilization; effect on nutritive and organoleptic attributes. Aseptic packaging of milk.

UNIT-IV

Special milk: vitaminized milk, flavored milk, chocolate milk etc.
Technology of fermented milk products: composition, importance, defects, B.I.S.. or P.F.A. standards.
Technology of dehydrated milk products: condensed milk; evaporated milk; milk power-spray and roller dried; malted milk power; composition, nutritive value, Importance, processing, storage defects, P.F.A./B.I.S. standards.

UNIT-V

Technology of fat rich milk products: cream, butter, butter oil, ghee;, traditional and industrial methods of preparation; packaging , storage, and marketing.
Technology of Ice-cream & other frozen milk products. Packaging of milk and milk products: importance of packaging & packaging materials.
Cleaning and sanitation of milk processing equipment.

References

Outlines of Dairy Technology - Sukumar Day

FST-204/2044 FOOD PROCESSING PRINCIPLES

Unit-I

Unit operations in Food Processing: Cleaning/ grading/ separation, Size reduction; Objectives, principles, machines;

Unit II

Heat transfer and thermal preservation, modes of heat transfer common heat exchangers pasteurization, blanching, sterilization of foods, UHT processing, canning, baking etc.

Cold preservation; refrigeration and freezing , refrigeration cycle, requirements for refrigerated storage, theory of freezing, freezing curve, freezing methods.

Unit III

Drying and dehydration; Moisture content and water activity of foods, theory of drying, drying rate, factors affecting drying rate, drying methods, common dryers.

Evaporation and concentration; food concentration methods, single and multi-effect evaporators. Intermediate moisture foods.

Food irradiation; Sources of radiation, mechanism of preservation; direct and Indirect effect.

Unit-IV : Chemical Preservation of Foods:

Food preservation by sugar and salt.

Food preservation by vinegar and other acids.

Food preservation by use enzymes and microbes (food fermentation)

Food preservation by fumes and smokes

Food preservation by chemical preservatives, food additives

Unit-V

Assessment of post harvest losses of food materials, sources of losses, practices to minimize the losses. Grain storage principles and practices.

Hydrothermal treatment to grains; parboiling of paddy, changes due to parboiling, advantages; parboiling of wheat; principles and methods and general milling operation of cereals, pulses and oilseeds.

REFERENCES

1-Fruits and Vegetables Preservation- R.P.Srivastava

2-Foods Facts and Principles- N.Shakuntala Manay

3-Food Science-N.N.Potter

4-PHT of cereals pulses and oilseeds-A.Chakravarty

5- Tech. of Food Preservation – Desrosier and Desrosier

FST 301/3041 FOOD EVALUATION

UNIT-I

Scope and importance of food evaluation in food industry. Determination of proximate composition in food samples. Estimation of calcium, phosphorus and iron in foods, Determination of starch, reducing sugars, non reducing sugars and total sugars in food samples.

UNIT-II

Estimation of vitamins (Vit.A, Vit.C, Riboflavin, and Thiamin)

Determination of anti-nutritional factors such as trypsin inhibitor, tannins, phytic acid, and urease activity.

Determination of available lysine, In-vitro digestibility of proteins in foods.

UNIT-III

Evaluation of spoilage of lipids (peroxidase-value, free-fatty acids, thiobarbituric acid)

Determination of enzymatic and non-enzymatic browning of food samples

Determination of rheological properties of liquid foods.

UNIT-IV SENSORY EVALUATION

Senses (Taste, smell, visual, auditory, kinesthetic, temperature, pain, and chemical senses). Their role in sensory evaluation.

Sensory tests, description and applications. Establishing sensory facilities, and panels.

Measurements of detection and recognition of the four basic tastes .

UNIT-V

Recognition of odourants, natural food colors, synthetic color.

Relative taste intensity and taste interaction.

Food and texture and its evaluation.

References

1. Handbook of analysis and quality control of fruits and vegetables-S.Rangana
2. Food analysis : Theory and practice – Y. Pomerang

FST 302/3042 TECHNOLOGY OF PLANT FOODS

Unit-I

Fruits and vegetables: Importance of fruits & Vegetables in diet. Structural features of fruits and vegetables texture contributing factors. Classification of fruits and vegetables, preservation of fresh of fruits and vegetables Canning and bottling of fruits and vegetables, fruit and vegetables juices (syrops, squashes, cordials, nectars, concentrates and powders.) Use of pectin in food products (Jam. Jelly and Marmalades). Pickles, Chutneys, Ketchup and Sauces, Tomato Products. Dehydration of Fruits and Vegetables.

Unit-II

Cereals: Importance and general composition of cereals.

Wheat: Traditional and turbo milling, flour and its uses, basics of extrusion technology

Technology of bakery products; bread, biscuits, cakes, doughnut and buns.

Rice: Milling and parboiling of paddy.

Corn: Wet and dry milling of corn; preparation of corn starch, syrups and corn flakes.

Barley: Nutritive value and malt preparation.

Unit-III

Pulses: Composition, traditional and modern methods of milling, processing, methods of cooking.

Unit-IV

Oilseeds: Composition, sources of protein and oil, protein concentrates and hydrolysates of oil sees cakes. Properties and uses of oilseed meals and flours.

Unit-V

Plantation products and Flavor technology: Spices: production, chemical composition, processing and refining, properties and uses of major spices, flavoring concentrates (oleoresin), essential oil, adulteration. Tea, Coffee and cacao: production, processing, chemical composition; tea, coffee and cocoa products,

References :-

- 1- Preservation of Fruits and Vegetables by Girdhari Lal
- 2-Preservation of Fruits and Vegetables by Vijaya Khader
- 3-Fruits and Vegetables Preservation- R.P.Srivastava
- 4-Foods Facts and Principles by N. Shakuntala Manay

FST 303/3043 TECHNOLOGY OF ANIMAL FOODS

UNIT-I

Meat Poultry and fish Industry in India, Indian statistics of different meat animals, Status of Meat Processing in India.

Different animals used for meat production. General characteristics of meat animals. Premortem examination of meat animals, glycogen loss, moisture loss, pH change in slaughtering, DFD and PSE meat. Effect of age on meat quality. Multi Purpose Animals, Unusual Species. Smoking of meat : Process, advantages and disadvantages

Curing of meat : Process, different methods and use

UNIT-II

Ante-mortem examination, slaughtering and post-mortem examination of meat. Nutritive value of meat, Postmortem carcass evaluation and storage. Postmortem physical and biochemical changes in meat. Rigor mortis and its significance.

UNIT-III

Poultry and Poultry Products : Slaughtering, Freezing, refrigeration and freeze drying of chicken. Types of Chickens, Layers, Meat Chickens, Dual - Purpose Chickens, Poussins, Spring Chickens (Broilers), Roasters, Broilers, Capons, Characteristics of Chickens

Processing quality of chicken, processing of poultry, Composition of poultry meat

UNIT-IV

Fish : Benefits of fish consumption, Status of fish production and processing in India, Dried, Salted and Smoked Fish, Surimi-Its production and processing. Onboard Handling And Preservation Of Fish, Preservation In Refrigerated Seawater (RSW), Drying and Dehydration of Fish, salting of fish, smoking of fish.

UNIT-V

Egg : White Eggs, Brown Eggs, Color, structure, Shell, White, Yolk, Fertile Eggs, Free-Range Eggs, Freshness, Grading of eggs, Organic Eggs, Candling Eggs, Egg Size Categories, Types of Egg Products, Refrigerated Liquid Egg Products, Frozen Egg Products, Dried Egg Products.

Packaging of meat, fish and poultry

References

1. Food Science (Potter)
2. Fish processing (Gopakumar)
3. Post harvest Technology of fish and Fish Products (Balachandran)
4. Meat and Meat Product Technology (B D Sharma)
5. Handbook of fishery Technology (Novikov)
6. An Introduction to Food Science Technology and Quality Management (D K Bhatt and Priyanka Tomar)

FST 304/3044 FOOD MICROBIOLOGY

UNIT-I

Microorganisms in foods: General characteristics of major groups of microorganisms, their importance in food industry. Sources of contamination – air, water, soil, sewage, and post processing contamination.. Intrinsic & Extrinsic factors which influence growth of microorganisms in foods.

UNIT-II

Food Spoilage and Food Contamination: Factors affecting spoilage. Spoilage of fresh and processed fruits & vegetables, milk & milk products spoilage, meat spoilage, fish and poultry products spoilage, cereals and pulses spoilage.

UNIT-III

Food Fermentations: Bacterial , Yeast & Mould cultures. Single and Mixed cultures. Propagation, maintenance & Evaluation of cultures. Factors affecting activity of cultures– Bacteriophage, Residual Antibiotics & Chemicals. Microbiology of fermented milks, cereal foods, vinegar, sausages, oriental foods, alcoholic beverages. Therapeutic value of fermented foods.

UNIT-IV

Probiotics,-Nutritional and therapeutic aspects. Food Infection and Intoxication- Bacteria and Non bacteria

References:

- Food Microbiology by Adams and Moss.
- Food Microbiology by James M Jay.
- Food Microbiology by Frazier

Program Outcomes (POs) Programme Specific Outcomes (PSOs)

B.Sc.(H) Food Technology

Program Outcomes (POs)

1. Apply knowledge gained in food chemistry, microbiology, engineering, and sensory evaluation to the development, processing, and preservation of safe, nutritious, and high-quality food products.
2. Design food products that meet the various food regulations and laws.
3. Trained to use advanced instruments and technologies to process and analyze food products and to solve food safety problems.
4. Critically assess and analyze food science information available in the public domain in an innovative and ethical way.
5. Competencies in all aspects of production, processing, and management in food industries and other food-related sectors, including as entrepreneurs.
6. Communicate technical and other relevant information effectively in both oral and written format to a diverse audience including supervisors, colleagues, consumers and government institutions.
7. Commitment to professionalism and ethical values.

Programme Specific Outcomes

B.Sc. (H) Food Technology :

- Students learn the application of food science for the selection, preservation, processing, packaging, distribution, and use of safe, nutritious, and wholesome food.
- Designed to produce food technologist graduates with capabilities of working and performing well in food-related industries, or entrepreneurs.
- The graduates may take positions in the area of food production, food ingredient supply, food research and development, food process engineering, food quality, and safety system, food analysis, and quality control, regulatory affairs, food marketing, etc.
- Graduates of the Food Technology Study Program have competence in designing the process of adding value to food by applying the principles of food science, technology and management by integrating various operating units to produce safe and quality food products.
- Trained to work in teams, interact with others from different backgrounds, be skilled in organizing and leading in a variety of situations
- Food Technology Gradates also may continue his/her study to Master and Doctorate degree to work in higher educations or research institutions

Course Outcome (COs) of BSc (H) Food Science & Technology

BSc (FST) I year

1 General Biology -1041

- a) Students will be able to describe living system including the nature organization and evolution.
- b) Students will be able to know the physiology, anatomy and metabolism of Plants and Animals.
- c) It will provide students with the broad conceptual background in the biological sciences.

2 General Chemistry – 1042

- a) Students will have understanding of basic fundamental concept, theoretical concept and experimental finding in chemistry.
- b) Students will be able to demonstrate, solve and derive conclusions in experiments.
- c) Students will develop an understanding of major concept in chemistry.

3 Introductory Food Technology – 1043

- a) Student will be able to understand about food and food pyramid.
- b) Student will be exposed to elementary food processing and unit operations.
- c) Students will know nutritional importance of different foods.
- d) It will provide understanding and knowledge of recent advancement in the food sector also.

4 Environment Science – 1044

The students will be able to know:

- a) Aspects of biological, physical and information relating to environment and solutions of these problems.
- b) Able to understand the environmental problems such as- public health, Land Management, Waste Disposal, Over-pollution, water, deforestation, Ecosystem, Endangered species, Climate Change, etc.
- c) Informed about biodiversity richness and the potential dangers to the species of animals, plants and microorganisms in the environment.

BSc (FST) II year

1 Food Biochemistry – 2041

- a) Students will be able to know the chemistry underline the properties and the reactions of various food components
- b) Students will be able to know properties of food molecules and the interaction with other food constituents.
- c) Students will gain knowledge of biochemical reaction responsible for quality of food.
- d) They will acquire sufficient knowledge of food chemistry to control reactions in food.

2 Gen Microbiology – 2042

The student will be able to:

- a) Understand history, scope and relevance of microbiology.
- b) Gain knowledge of various methods to grow and control microorganism in lab.
- c) Understand the physiology, classification and metabolism in microbes.
- d) Understand the role of microorganism in different industries.

3 Dairy Technology – 2043

The students will be able to learn:

- a) About the production and consumption of milk and milk products in India and abroad.
- b) About the milk, its composition, nutritive value and characteristics.
- c) About the microbiology of milk, spoilage, preservation and its fermentation.
- d) About the processing of fluid milk.
- e) About the milk quality and its determination.
- f) About the cleaning and sanitation of dairy plant.
- g) Brief about the types of milk products, their definition, manufacturing, packaging and storage.

4 Food Processing Principles – 2044

By the end of the course students can be able to:

- a) To have basic knowledge of Food processing principles and various preservation methods.
- b) To apply various processing methods in the manufacturing of different food materials.
- c) To have knowledge of food properties & effect of different processing methods on food constituents.
- d) To define various unit operations for food processing.
- e) Understand/analyse the reasons of post-harvest losses and methods of their prevention.

- f) Analyse the storage conditions suitable for different types of food materials.

BSc (FST) III year

1 Food Evaluation – 3041

The student will be able to understand the:

- a) Testing and evaluation of various parameters of food quality.
- b) Different techniques to perform sensory evaluation study of foods.
- c) Hands on training on chemical analysis of specific food products.
- d) The basic principles of technique used in food analysis for quality assurance.

2 Technology of Plant Foods – 3042

- a) The student will be able to understand regarding to nutritional value, classification of the plant foods.
- b) To learn about the basic aspects of baking and various method of baking, techniques and use of instruments etc.
- c) Method of processing, preservation of different kind of plant food products.

3 Technology of Animal Foods – 3043

- a) Students came to know about the possibility of development of meat based industry
- b) Students learned about different meat processing methods
- c) Knowledge about different types of meat animals and their population in India was very fascinating for students
- d) Visit of meat processing plant was a very good experience for the students

4 Food Microbiology – 3044

The student will be able to:

- a) Understand microbiological analysis methods for food products
- b) Analyze different food for presence of hazardous microorganism using food microbiology.
- c) Describe the beneficial role of microorganism in fermented foods and in food processing.
- d) Understand the principle involving food spoilage and preservation involving microorganism.